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Characteristics and Outcomes of Midlines That Dwell Beyond 14 Days

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Purpose/Background

- Midline catheters have emerged as reliable vascular access devices for peripherally compatible infusates
- Guidelines recommend midlines when intended dwell is ≤14 days since little is known about its safety beyond this period
- We compare characteristics and outcomes in patients with midlines dwelling for ≤14 days and >14 days

Methods

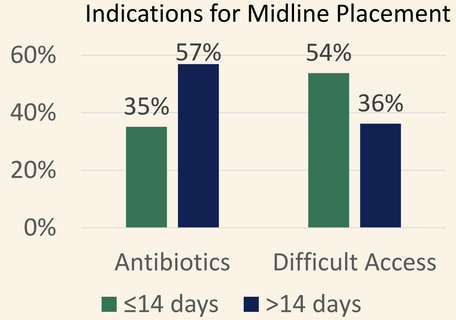
- Between 12/2016 and 11/2023, midline placements at 67 hospitals participating in the Michigan Hospital Medicine Safety Consortium were sampled
  - Data collected by trained abstractors
- Study population: hospitalized adult patients in general medicine and intensive care units
- Primary outcomes:
  - Major complications: catheter-related bloodstream infection (CRBSI) and catheter-related venous thromboembolism (CR-VTE)
  - Minor complications: tip migration, catheter dislodgement, occlusion, infiltration, superficial thrombosis or exit site problems
  - Device failure, defined as premature device removal due to any device complication
- Patients were followed until midline removal, death or 30 days from insertion, whichever came first
- Statistical analysis: Student's T-test for continuous variables and Chi-square test for categorical variables. Survival models run while adjusting for pre-specified covariates

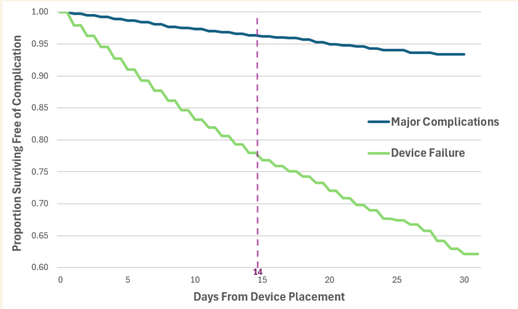
Results

27,300 Midlines Placed from 12/2016 to 11/2023

88% dwelled ≤ 14 days
median dwell, 5 days (IQR, 3 to 8 days)

12% dwelled > 14 days
median dwell, 20 days (IQR, 17 to 25 days)





Frequency of Midline Complications, by Dwell Time

Outcomes	Total N = 27,300	≤14 days N = 24,117	> 14 days N = 3,183	P-value
Any Major or Minor Complication	14.0%	14.1%	13.6%	.42
Any Major Complication	1.6%	1.4%	2.7%	<.001
Catheter-related BSI	0.3%	0.2%	0.6%	<.001
Catheter-related VTE	1.3%	1.2%	2.1%	<.001
Upper extremity DVT	1.1%	1.0%	1.5%	.03
Pulmonary embolism	0.3%	0.0%	0.7%	<.001
Any Minor Complication	13.0%	13.1%	11.6%	.02
Catheter dislodgement	4.8%	5.1%	2.6%	<.001
Catheter occlusion	2.7%	2.7%	3.0%	.36
Catheter tip migration	0.9%	0.8%	1.5%	<.001
Infiltration	1.6%	1.6%	0.0%	NA
Superficial thrombosis	1.0%	1.0%	0.9%	.66
Exit site problems	3.7%	3.6%	4.6%	.007
Device Failure	12.2%	12.5%	9.4%	<.001

Limitations

- Data was collected retrospectively from patients' medical records, and was limited to documentation for patient care purposes
- Observational study, thus analysis may be limited by residual confounding

Conclusions

- Midlines dwelling >14 days are common, and the majority are placed for antibiotic infusion
- Longer dwell midlines appear to have higher rates of major complications, but lower rates of minor complications and device failure compared to shorter dwell midlines
- Future studies should account for the potential effect of specific infusates on these outcomes

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